



## Huntington disease

Huntington disease is a progressive brain disorder that causes uncontrolled movements, emotional problems, and loss of thinking ability (cognition).

Adult-onset Huntington disease, the most common form of this disorder, usually appears in a person's thirties or forties. Early signs and symptoms can include irritability, depression, small involuntary movements, poor coordination, and trouble learning new information or making decisions. Many people with Huntington disease develop involuntary jerking or twitching movements known as chorea. As the disease progresses, these movements become more pronounced. Affected individuals may have trouble walking, speaking, and swallowing. People with this disorder also experience changes in personality and a decline in thinking and reasoning abilities. Individuals with the adult-onset form of Huntington disease usually live about 15 to 20 years after signs and symptoms begin.

A less common form of Huntington disease known as the juvenile form begins in childhood or adolescence. It also involves movement problems and mental and emotional changes. Additional signs of the juvenile form include slow movements, clumsiness, frequent falling, rigidity, slurred speech, and drooling. School performance declines as thinking and reasoning abilities become impaired. Seizures occur in 30 percent to 50 percent of children with this condition. Juvenile Huntington disease tends to progress more quickly than the adult-onset form; affected individuals usually live 10 to 15 years after signs and symptoms appear.

### Frequency

Huntington disease affects an estimated 3 to 7 per 100,000 people of European ancestry. The disorder appears to be less common in some other populations, including people of Japanese, Chinese, and African descent.

### Genetic Changes

Mutations in the *HTT* gene cause Huntington disease. The *HTT* gene provides instructions for making a protein called huntingtin. Although the function of this protein is unknown, it appears to play an important role in nerve cells (neurons) in the brain.

The *HTT* mutation that causes Huntington disease involves a DNA segment known as a CAG trinucleotide repeat. This segment is made up of a series of three DNA building blocks (cytosine, adenine, and guanine) that appear multiple times in a row. Normally, the CAG segment is repeated 10 to 35 times within the gene. In people with Huntington disease, the CAG segment is repeated 36 to more than 120 times. People with 36 to 39

CAG repeats may or may not develop the signs and symptoms of Huntington disease, while people with 40 or more repeats almost always develop the disorder.

An increase in the size of the CAG segment leads to the production of an abnormally long version of the huntingtin protein. The elongated protein is cut into smaller, toxic fragments that bind together and accumulate in neurons, disrupting the normal functions of these cells. The dysfunction and eventual death of neurons in certain areas of the brain underlie the signs and symptoms of Huntington disease.

## **Inheritance Pattern**

This condition is inherited in an autosomal dominant pattern, which means one copy of the altered gene in each cell is sufficient to cause the disorder. An affected person usually inherits the altered gene from one affected parent. In rare cases, an individual with Huntington disease does not have a parent with the disorder.

As the altered *HTT* gene is passed from one generation to the next, the size of the CAG trinucleotide repeat often increases in size. A larger number of repeats is usually associated with an earlier onset of signs and symptoms. This phenomenon is called anticipation. People with the adult-onset form of Huntington disease typically have 40 to 50 CAG repeats in the *HTT* gene, while people with the juvenile form of the disorder tend to have more than 60 CAG repeats.

Individuals who have 27 to 35 CAG repeats in the *HTT* gene do not develop Huntington disease, but they are at risk of having children who will develop the disorder. As the gene is passed from parent to child, the size of the CAG trinucleotide repeat may lengthen into the range associated with Huntington disease (36 repeats or more).

## **Other Names for This Condition**

- Huntington chorea
- Huntington chronic progressive hereditary chorea
- Huntington's chorea
- Huntington's disease

## **Diagnosis & Management**

### Genetic Testing

- Genetic Testing Registry: Huntington's chorea  
<https://www.ncbi.nlm.nih.gov/gtr/conditions/C0020179/>
- Genetic Testing Registry: Juvenile onset Huntington's disease  
<https://www.ncbi.nlm.nih.gov/gtr/conditions/C0751208/>

### Other Diagnosis and Management Resources

- GeneReview: Huntington Disease  
<https://www.ncbi.nlm.nih.gov/books/NBK1305>
- Huntington's Disease Society of America: HD Care  
<http://hdsa.org/living-with-hd/>
- MedlinePlus Encyclopedia: Huntington Disease  
<https://medlineplus.gov/ency/article/000770.htm>
- University of Washington Medical Center: Testing for Huntington Disease: Making an Informed Choice  
<http://depts.washington.edu/neurolog/images/neurogenetics/hungtinton.pdf>

### General Information from MedlinePlus

- Diagnostic Tests  
<https://medlineplus.gov/diagnostictests.html>
- Drug Therapy  
<https://medlineplus.gov/drugtherapy.html>
- Genetic Counseling  
<https://medlineplus.gov/geneticcounseling.html>
- Palliative Care  
<https://medlineplus.gov/palliativecare.html>
- Surgery and Rehabilitation  
<https://medlineplus.gov/surgeryandrehabilitation.html>

## **Additional Information & Resources**

### MedlinePlus

- Encyclopedia: Huntington Disease  
<https://medlineplus.gov/ency/article/000770.htm>
- Health Topic: Huntington's Disease  
<https://medlineplus.gov/huntingtonsdisease.html>

### Genetic and Rare Diseases Information Center

- Huntington disease  
<https://rarediseases.info.nih.gov/diseases/6677/huntington-disease>
- Juvenile Huntington disease  
<https://rarediseases.info.nih.gov/diseases/10510/juvenile-huntington-disease>

### Additional NIH Resources

- GeneEd  
[https://geneed.nlm.nih.gov/topic\\_subtopic.php?tid=142&sid=169](https://geneed.nlm.nih.gov/topic_subtopic.php?tid=142&sid=169)
- National Human Genome Research Institute: Learning About Huntington's Disease  
<https://www.genome.gov/10001215/>
- National Institute of Neurological Disorders and Stroke: Huntington's Disease Information Page  
<https://www.ninds.nih.gov/Disorders/All-Disorders/Huntingtons-Disease-Information-Page>
- National Institute of Neurological Disorders and Stroke: Huntington's Disease: Hope Through Research  
<https://www.ninds.nih.gov/Disorders/Patient-Caregiver-Education/Hope-Through-Research/Huntingtons-Disease-Hope-Through>

### Educational Resources

- Centre for Genetics Education  
<http://www.genetics.edu.au/Publications-and-Resources/Genetics-Fact-Sheets/FS55HUNTINGTONDISEASE.pdf>
- Disease InfoSearch: Huntington disease  
<http://www.diseaseinfosearch.org/Huntington+disease/3497>
- Genetic Science Learning Center, University of Utah  
<http://learn.genetics.utah.edu/content/disorders/singlegene/>
- HOPES: Huntington's Outreach Project for Education, at Stanford  
[https://web.stanford.edu/group/hopes/cgi-bin/hopes\\_test/](https://web.stanford.edu/group/hopes/cgi-bin/hopes_test/)
- Johns Hopkins Medicine  
[http://www.hopkinsmedicine.org/psychiatry/specialty\\_areas/huntingtons\\_disease/patient\\_family\\_resources/education\\_what\\_is.html](http://www.hopkinsmedicine.org/psychiatry/specialty_areas/huntingtons_disease/patient_family_resources/education_what_is.html)
- MalaCards: huntington disease  
[http://www.malacards.org/card/huntington\\_disease](http://www.malacards.org/card/huntington_disease)
- Merck Manual Consumer Version  
<http://www.merckmanuals.com/home/brain-spinal-cord-and-nerve-disorders/movement-disorders/huntington-disease>
- My46 Trait Profile  
<https://www.my46.org/trait-document?trait=Huntington%20Disease&type=profile>

- Orphanet: Huntington disease  
[http://www.orpha.net/consor/cgi-bin/OC\\_Exp.php?Lng=EN&Expert=399](http://www.orpha.net/consor/cgi-bin/OC_Exp.php?Lng=EN&Expert=399)
- Your Genes Your Health from Cold Spring Harbor Laboratory  
<http://www.ygyh.org/hd/whatisit.htm>

#### Patient Support and Advocacy Resources

- Family Caregiver Alliance  
<https://www.caregiver.org/health-issues/huntingtons>
- HDBuzz  
<https://en.hdbuzz.net/>
- Hereditary Disease Foundation  
<http://www.hdfoundation.org/>
- Huntington Society of Canada  
<http://www.huntingtonsociety.ca/>
- Huntington's Disease Society of America  
<http://hdsa.org/>
- National Organization for Rare Disorders (NORD)  
<https://rarediseases.org/rare-diseases/huntingtons-disease/>
- Resource list from the University of Kansas Medical Center  
<http://www.kumc.edu/gec/support/huntingt.html>

#### GeneReviews

- Huntington Disease  
<https://www.ncbi.nlm.nih.gov/books/NBK1305>

#### ClinicalTrials.gov

- ClinicalTrials.gov  
<https://clinicaltrials.gov/ct2/results?cond=%22huntington+disease%22>

#### Scientific Articles on PubMed

- PubMed  
<https://www.ncbi.nlm.nih.gov/pubmed?term=%28Huntington+Disease%5BMAJR%5D%29+AND+%28Huntington+disease%5BTIAB%5D%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+720+days%22%5Bdp%5D>

#### OMIM

- HUNTINGTON DISEASE  
<http://omim.org/entry/143100>

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